

Claims

[c1] What is claimed is:

1. A method of maintaining a private branch exchange (PBX) system, the PBX system comprising a first top-level host, the first top-level host being used for serving a plurality of IP-based PBX extensions, the method comprising:

utilizing a first medium-level host for checking if the first top-level host is capable of serving the IP-based PBX extensions; and

utilizing the first medium-level host for functioning as a second top-level host to substitute for the first top-level host if the first top-level host is unable to serve the IP-based PBX extensions.

[c2] 2. The method of claim 1 further comprising:

utilizing a bottom-level host for checking if the first medium-level host functions as the second top-level host; and

utilizing the bottom-level host for functioning as a second medium-level host to substitute for the first medium-level host if the first medium-level host functions as the second top-level host.

- [c3] 3. The method of claim 2 wherein the first top-level host, first medium-level host, and the bottom-level host are connected to the Internet through an IP-sharing.
- [c4] 4. The method of claim 2 wherein the first medium-level host periodically outputs a survival packet to inform the bottom-level host that the first medium-level host does not function as the second top-level host yet.
- [c5] 5. The method of claim 2 wherein the bottom-level host periodically outputs a query packet to the first medium-level host, and the first medium-level host returns an acknowledge packet corresponding to the query packet to inform the bottom-level host that the first medium-level host does not function as the second top-level host yet.
- [c6] 6. The method of claim 2 further comprising:
 - utilizing the first medium-level host to periodically backup data stored in the first top-level host when the first top-level host is capable of serving the IP-based PBX extensions; and
 - utilizing the second medium-level host to periodically backup data stored in the second top-level host when the first medium-level host functions as the second top-level host.

- [c7] 7. The method of claim 1 wherein the first top-level host periodically outputs a survival packet to inform the first medium-level host that the first top-level host is capable of serving the IP-based PBX extensions.
- [c8] 8. The method of claim 1 wherein the first medium-level host periodically outputs a query packet to the first top-level host, and the first top-level host returns an acknowledgment packet corresponding to the query packet to inform the first medium-level host that the first top-level host is capable of serving the IP-based PBX extensions.
- [c9] 9. The method of claim 1 wherein the first top-level host and first medium-level host are connected to the Internet through an IP-sharing.
- [c10] 10. An apparatus of maintaining a private branch exchange (PBX) system, comprising:
a first top-level host for serving a plurality of IP-based PBX extensions in the PBX system; and
a first medium-level host connected to the first top-level host for checking if the first top-level host is capable of serving the IP-based PBX extensions, utilizing the first medium-level host for functioning as a second top-level host to substitute for the first top-level host if the first

top-level host is unable to serve the IP-based PBX extensions.

- [c11] 11. The apparatus of claim 10 further comprising:
a bottom-level host connected to the first medium-level host for checking if the first medium-level host functions as the second top-level host, utilizing the bottom-level host for functioning as a second medium-level host to substitute for the first medium-level host if the first medium-level host functions as the second top-level host.
- [c12] 12. The apparatus of claim 11 wherein the first top-level host, first medium-level host, and the bottom-level host are connected to the Internet through an IP-sharing.
- [c13] 13. The apparatus of claim 11 wherein the first medium-level host periodically outputs a survival packet to inform the bottom-level host that the first medium-level host does not function as the second top-level host yet.
- [c14] 14. The apparatus of claim 11 wherein the bottom-level host periodically outputs a query packet to the first medium-level host, and the first medium-level host returns an acknowledge packet corresponding to the query packet to inform the bottom-level host that the first medium-level host does not function as the second top-

level host yet.

- [c15] 15. The apparatus of claim 11 wherein the first medium-level host periodically backups data stored in the first top-level host when the first top-level host is capable of serving the IP-based PBX extensions, and the second medium-level host periodically backups data stored in the second top-level host when the first medium-level host functions as the second top-level host.
- [c16] 16. The apparatus of claim 10 wherein the first top-level host periodically outputs a survival packet to inform the first medium-level host that the first top-level host is capable of serving the IP-based PBX extensions.
- [c17] 17. The apparatus of claim 10 wherein the first medium-level host periodically outputs a query packet to the first top-level host, and the first top-level host returns an acknowledge packet corresponding to the query packet to inform the first medium-level host that the first top-level host is capable of serving the IP-based PBX extensions.
- [c18] 18. The apparatus of claim 10 wherein the first top-level host and first medium-level host are connected to the Internet through an IP-sharing.